GEK-61435A
Supersedes GEK-5180J

INSTRUCTIONS

FUEL AND LUBRICANT SPECIFICATIONS

FOR EXPORT LOCOMOTIVES EQUIPPED WITH GE DIESEL ENGINES

SPECIFICATIONS FOR OILS AND GREASES

(For Suggested Sources of Supply See GEK-61436)

AAR SPECIFICATIONS

AAR M-912 — TRIPLE VALVE OIL

Flash Point (open cup), minimum	375 F/190 C
Fire Point (open cup), minimum	400 F/204 C
Viscosity, SSU @ 100 F/38 C	190-220
Viscosity Index, minimum	130
Pour Point, maximum	-50 F/-46 C
Oxidation Number (Sligh), maximum	6

AAR M-913 — TRIPLE VALVE GRAPHITE

Graphite Carbon Content, minimum percent	97
Ash Content, maximum percent	3

Graphite shall be artificial or flake graphite, free from grit, and containing no free iron. All graphite shall pass through a 100-mesh sieve, and 96 percent shall pass through a 200-mesh sieve.

AAR M-914 — BRAKE CYLINDER GREASE

Worked Consistency, MM/10 @ 77 F/25 C	250-300
Worked Consistency, MM/10, minimum @ 0 F/-18 C	150
Lime Soap Base:	
Water, maximum percent	1.5
Free Fatty Acid, maximum percent	0.25
Uncombined Lime, maximum percent	0.15
Mineral Oil, percent	80-85
Viscosity, SSU @ 100 F/38 C	550-700

Grease shall not freeze or become solid at -40 F/-40 C

AAR M-917 — GRADE B JOURNAL BEARING GREASE

Corrosion	Negative
Worked Consistency, MM/10 @ 77 F/25 C	290-320
Worked Consistency, MM/10, minimum @ 0 F/-18 C	150
Dropping Point, minimum	325 F/163 C
Free Alkali, maximum percent	0.50
Free Acid (as Oleic), maximum percent	0.30
Oxidation Stability:	
Drop in 100 hours, maximum	10 psi/0,7 bar
Drop in 500 hours, maximum	25 psi/1,7 bar
Structure Stability:	
Maximum Increase in Penetration at 77 F/25 C (worked) after 100,000 Double Strokes in Standard Grease Worker	25
Moisture, maximum percent	0.50
Flash Point (open cup), minimum	340 F/171 C
Pour Point, upper, maximum	0 F/-18 C
Viscosity, SSU @ 100 F/38 C	450-550
Viscosity, minimum, SSU @ 210 F/99 C	59

AAR M-963 — CAR JOURNAL OIL

Medium 30 Weight (Year Around)

Flash Point (open cup), minimum	350 F/177 C
Fire Point, minimum	380 F/193 C
Viscosity, SSU @ 210 F/99 C	53-58
Viscosity Index, minimum	125
Pour Point, upper, maximum	-35 F/-37 C
Moisture, maximum percent	0.10
Pentane Insolubles, percent	0.10

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

Verify numbers for parts, tools, or material by using the Renewal Parts or Tool Catalogs, or contact your General Electric representative for assistance. Do not order from this publication.

GENERAL ELECTRIC

AAR M-963 (Cont'd.)

pH	pH 6.5 to 9
Ash percent	0.15
Rust-Preventing Characteristics Test	No rust
Corrosion - humidity, cabinet	No more than 3 dots

GE SPECIFICATIONS

D6A2C4 — BALL AND ROLLER BEARING GREASE

Worked Consistency, 77 F/25 C, MM/10, minimum	260
Dropping Point, minimum	400 F/204 C
Mineral Oil Viscosity, SSU @ 100 F/38 C	220-500
Free Alkali, maximum percent	0.60
Free Acid, maximum percent	Nil
Color	Brown
Base	Sodium
Soap Content, percent	23-26
Oxidation Resistance Time to Reach 20 psi Drop at 210 F/1,4 bar at 99 C, hour, minimum	400
Evaporation, 500 hour @ 212 F/100 C, maximum percent	6
Oil Bleeding, 500 hour @ 212 F/100 C, maximum percent	6
Corrosion	Must pass

NOTE: ***This grease must not be applied through a grease fitting or orifice with less than 1/4 in. (6,35 mm) inside diameter or through smaller than 1/8 in. (3,18 mm) pipe.***

D6A2C5 — BALL AND ROLLER BEARING GREASE

Worked Consistency, 77 F/25 C MM/10	265-295
Dropping Point, minimum	340 F/171 C
Free Alkali, maximum percent	0.35
Free Acid, maximum percent	Nil
Color	Amber
Base (with anti-oxidant)	Lithium
Oxidation Resistance Time to Reach 20 psi Drop at 210 F/1,4 bar at 99 C, hour, minimum	750
Corrosion	Must pass

D6A2C9 — BALL AND ROLLER BEARING GREASE: PETROLEUM BASE

Worked Consistency, MM/10	240-280
Dropping Point, min.	350 F/177 C
Mineral Oil Viscosity, SSU @ 100 F/38 C	525-575

D6A2C9 (Cont'd.)

Soap Base	Sodium
Free Acid as Oleic, percent, maximum	Nil
Dirt Particles per g, maximum	4
Color	Amber
Soluble in Water	Yes

GE SPECIFICATION D6A2C10 — BALL AND ROLLER BEARING GREASE

Worked Consistency, 77 F/25 C, MM/10	220 to 240
Dropping Point, minimum	380 F/193 C
Mineral-Oil Viscosity at 100 F/38 C, SSU	475 to 525
Free Alkali, maximum percent	0.50
Free Acid, maximum percent	Nil
Color	Amber
Base	Lithium
Soap Content, percent	10 to 13
Oxidation Resistance Time to Reach 20 psi Drop at 210 F/99 C, minimum	1000 hrs.
Evaporation, 500 hour @ 100 C, maximum percent	4
Oil Bleeding, 500 hour @ 100 C, maximum	3

D6B20B — AUTOMATIC AND INDUSTRIAL GEAR OIL

Gravity, API, minimum	21.5
Color, ASTM, max.	8
Pour Point	0 F/-18 C
Flash Point, COC, minimum	375 F/190 C
Viscosity, SSU @ 100 F/38 C	800-1500
Viscosity, SSU @ 210 F/99 C	—
Viscosity Index, minimum	50
Precipitation No.	Trace
Ash, percent, maximum	0.02

D50E5B — MINERAL OIL

Flash Point, minimum	390 F/199 C
Fire Point, minimum	400 F/204 C
Viscosity, SSU @ 100 F/38 C	230-250
Viscosity, SSU @ 210 F/99 C	48-52
Viscosity Index, minimum	100
Pour Point, maximum	-10 F/-23 C
Aniline Point, minimum	203 F/95 C
Neutralization Number, maximum	0.075
Oxidation Inhibitor	Permitted
Corrosion Inhibitor	Permitted
Detergents	None

D50E6B — SPECIAL PURPOSE GREASE

Worked Consistency, MM/10 @ 77 F/25 C	365-385

D50E6B (Cont'd.)

Unworked Consistency, MM/10 @ 77 F/25 C 360-385
Dropping Point, minimum ..... 300 F/149 C
Mineral Oil Viscosity, SSU @ 100 F/38 C 200-300
Soap Base ..... Sodium
Free Alkali (as NaOH), maximum percent 0.35
Free Acid (as Oleic), maximum percent ..... Nil

D50E8C — GEAR LUBRICANT

Worked Consistency, 77 F/25 C, MM/10 360-395
Dropping Point, minimum ..... 325 F/163 C

D50E8C (Cont'd.)

Mineral Oil Viscosity, SSU, minimum @ 210 F/99 C 1500
Mineral Oil Viscosity Index, approximate 100
Soap Base ..... Sodium
Soap, maximum percent 2.5
Free Alkali, maximum percent 0.1
Free Acid, maximum percent 0.1
Timken Number, minimum 35

NOTE: ***GE approved brands are Arco Jet Lubricant TM; British-Petroleum Oil Company, B-P Jet Lubricant TM Compound; Shell TM Gear Compound.***

D50E13 — AIR COMPRESSOR LUBRICATING OIL

D50E13A — Gardner-Denver Compressors, ASTM Viscosity Grade Number S150
D50E13B — WAB Company Compressors (Low Ambient Temperature), ASTM Viscosity Grade Number S215
D50E13C — WAB Company Compressors (Normal Ambient Temperature), ASTM Viscosity Grade Number S315

Properties	D50E13A	D50E13B	D50E13C
Viscosity @ 0 F/-18C	10,000 Max.	—	—
@ 100 F/38 C	140-200 SSU	193-237 SSU	283-347 SSU
@ 210 F/99 C	40-48 SSU	45-50 SSU	50-58 SSU
Viscosity Index	90 Min.	90 Min.	90 Min.
Pour Point, degrees, max.	-10 F/-23 C	-20 F/-29 C	0 F/-18 C
Flash Point, degrees, min.	375 F/191 C	400 F/204 C	420 F/216 C
Oxidation Inhibitor	Required	Required	Required
Rust Inhibitor	Required	Required	Required
Foam Inhibitor	Required	Required	Required
Anti-Wear	Required	Required	Required
Detergents	None	None	None

D50E14B — SUSPENSION BEARING OIL

Gravity — API minimum 23.0-27.0
Flash Point, minimum ..... 400 F/204 C
Pour Point, maximum ..... -10 F
Viscosity, SSU @ 100 F/38 C 675-775
Viscosity, SSU @ 210 F/99 C 68-71
Viscosity Index, minimum 80
Color ..... Green-Blue
Neutralization Number, minimum 1.50
Saponification Number, minimum 6.0
Sulfer, maximum 0.50

NOTE: ***D50E14B is recommended for year-around lubrication of traction motor suspension bearings. If D50E14B is not available, use AAR Spec. M-963 (latest revision) which is compatible with D50E14B.***

D50E16 — SEAL LUBRICANT

Worked Consistency, 77 F/25 C, MM/10 265-295
Dropping Point, minimum degrees F/C 350/177
Mineral Oil Viscosity, SSU @ 100 F/38 C 900-1200
Soap Base ..... Lithium
Additive ..... Molybdenum Disulfide
Additive, percent, nominal 3.0

D50E17 — EXTREME PRESSURE MULTI-PURPOSE GREASE

Worked Consistency, 77 F/25 C, MM/10 265-295
Dropping Point, minimum, degrees F/C 350/177
Timken Test, pounds, pass 40
Mineral Oil Viscosity, SSU @ 100 F/38 C 900-1200
Soap Base ..... Lithium

D50E21 — EXTREME PRESSURE GREASE

Worked Consistency, 77 F/25 C, MM/10	265-295
Dropping Point, minimum degrees F/C	340/171
Timken Test, pounds, pass	40
Mineral Oil Viscosity, SSU @ 100 F/38 C	800-1200
Soap Base	Lithium
Rust Test ASTM D1743	Pass

ENGINE LUBRICATING OILS

The General Electric 7FDL diesel engine requires a heavy-duty, highly dispersant SAE 40 lubricating oil having a minimum new oil viscosity of 75 SSU at 210 F and a viscosity index of 60 to 105.

Modern diesel engines require lubricating oils which provide more good performance features than can be defined by viscosity alone. These parameters include: corrosion protection of power assembly and bearings, deposit control in high-temperature regions such as pistons, and deposit control in lower temperature regions such as oil coolers.

There are many industrial and automotive systems of lubricating oil performance specifications. Unfortunately, none of them adequately define the needs of highly rated railroad diesel engines. Thus, it is necessary to define those needs by performance tests in the actual engine. Successful formulations must then be listed by brand name.

It is always possible and often desirable to divide approved listing of oils into categories based on their formulation and their performance success. In previous General Electric lists, these categories were called: "Superior Class I" and "Superior Class II." In recent times we have seen significant changes in operating conditions on the world's railways. These changes include: increased engine ratings, greater use at high output, increasing sulfur level of fuel oil and more shutdown when not in use and resultant warm-up times in order to save fuel. These changes pointed to the need for even better lubricants than Superior Class II. Such products were developed and evaluated in actual field applications and have been named "Extra Performance" products.

Nearly all lubricants formerly listed as Superior Class I are now out of production. Because of this fact and the wide availability of better products, General Electric will no longer refer to or list Superior Class I products.

Within the list of products formerly listed as Class II, most formulations have an alkalinity value (associated with corrosive wear protection) of 10 or greater by American Society for Testing Materials (ASTM) Procedure 2896, while some of those products had an alkalinity level as low as 7. Those oils with an alkalinity value of 10 or greater are now classified as Superior Class II Higher Alkalinity or Generation 3, while others are called Superior Class II Regular or Generation 2. Only Generation 3 products are listed. General Electric considers these lubricants to be the minimum performance grade that is acceptable, and then only where Class A fuel is available.

The list of "Extra Performance" or Generation 4 oils has been greatly expanded, and additional formulations are still being developed. Generation 4 oils are required whenever fuels having greater than 0.30% sulfur are used.

NOTE: ***The use of fuels or lubricants other than the above, or in a manner other than the above, requires the explicit approval of General Electric.***

ENGINE FUEL OILS

Satisfactory engine performance may be expected with fuel oil meeting the specifications listed below. Two quality levels are listed, with "Class A" being the better. A "Class A" fuel is, with one exception, ASTM Specification D-975 No. 2D. The GE "Class A" sulfur limit is lower than that permitted by ASTM.

The "Class B" fuel permits even broader physical properties than ASTM No. 2D fuel and; with this publication, they are expanded still further. Recent tests have shown that GE engines can operate with fuel having the properties listed below, but such fuel represents the extreme limits of GE recommended fuel quality. It will be necessary to compensate for the broader property limits of Class B fuel. The engine may require more maintenance than it does with a higher quality fuel.

In addition, more attention to the selection and control of lubricating oil is necessary.

Both of these fuel grades represent distillate gas oils. They are intended to be applicable for use in high-speed engines and medium-speed engines. The requirements of these classes are as follows:

FUEL OIL SPECIFICATIONS FOR GE DIESEL ENGINES
REVISED OCTOBER, 1980

Property	Limits	
	Class A	Class B
Flash Point, degrees (both Class A and B)	Min. 125 F/52 C or legal	
Pour Point, degrees (both Class A and B)	Max. 10 F/5.5 C lower than ambient operating temperature during cold weather	
Carbon Residue on 10 percent bottom, percent	Max. 0.35	Max. 0.35
Water and Sediment, percent by volume	Max. 0.05	Max. 0.10
Ash, percent weight	Max. 0.01	Max. 0.02
Distillation Temperature, degrees, 90 percent point	540 to 640 F/282 to 337 C	Max. 680 F/360 C
Final Boiling Point, degrees	—	Max. 700 F/371 C
Distillation Recovery	99%	99%
Viscosity @ 100 F/38 C, kinematic centistrokes	2.0 to 4.3	1.8 to 7.4
Viscosity @ 100 F/38 C, SSU	32.6 to 40.1	32.6 to 50.0
Sulphur, percent weight	Max. 0.30	Max. 1.0
Copper Strip Corrosion	Max. No. 3	Max. No. 3
Cetane Number (see note below)	Min. 40	Min. 37

NOTE: ***Low ambient temperature as well as engine operation at high altitudes may require use of fuel with higher cetane ratings.***

NOTES: